

## 5.—The Uranoscopidae of Western Australia (Pisces, Perciformes)

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### Introduction

McCulloch (1929, p. 335-336) lists six species of Uranoscopidae for Australia and only one species, *Kathetostoma nigrofasciatum*, as occurring in Western Australia. Whitley (1948, p. 27), in the latest list of fishes found in this state, increased the number of species recorded from Western Australia to two, *Kathetostoma nigrofasciatum*, and *Ichthyoscopus sannio* (*I. sannio* is the species referred to in earlier literature as *Ichthyoscopus lebeck* or *I. inerme*, cf. Whitley, 1936, p. 45).

It came as a surprise to me, and is an additional proof of the general poverty of ichthyological knowledge of this state, that I found in the collection of the Western Australian Museum and among material recently received, not less than six species of stonelifters and stargazers from Western Australia, of which three will here be described as new.

I would have liked to present a revision of the whole family of the Uranoscopidae, but for two reasons found this impractical. The first is that revisional work on a group of almost world-wide distribution can only with great difficulty be carried out in a somewhat isolated museum with a small collection and limited library facilities. The second is that many species of Uranoscopidae are very rare in collections, or are even known from their type specimens only. Obviously it would be difficult to receive these specimens on loan or to add anything essential to their original descriptions.

On the other hand, the detached description of a few supposedly new species, without mention of their nearest relatives—something that, unfortunately, has only too frequently been done—is about the poorest possible contribution to ichthyology, and rather adds to the burden of the future reviser than helps him. Therefore, I have taken a middle course: I have, from available literature, constructed a key to all the genera of Uranoscopidae, and a key to the species of the genus *Ichthyoscopus*. As far as I can judge, with the exception of the large genus *Uranoscopus*, which probably will be found to harbour much nomenclatural weed among its many described species, the genera and species of the family differ from each other by clear-cut characters which have been well-described, so that perhaps there is no real need of a thorough revision. A revision of the genus *Ichthyoscopus*, however, is necessary.

A description of the family characters is out of place in this short review, but I want to comment on one point. Though the velum behind the dentition of the lower jaw is usually well

developed, none of the Australian species has it with a filament. The only species with such a filament which I examined personally, is *Uranoscopus scaber* Linnaeus from the Mediterranean.

It is a pleasure to acknowledge my indebtedness to my colleagues Dr. M. Boeseman (Rijksmuseum van Natuurlijke Historie, Leiden), Mr. A. C. Wheeler (British Museum (Natural History), London), and Mr. G. P. Whitley (Australian Museum, Sydney), who gave much useful information on material under their care, and to the directors of the Australian Museum, Sydney, and the National Museum of Victoria, Melbourne, for the loan of specimens.

### Key to the Genera of Uranoscopidae

1. a. Humeral spine exposed or obsolete..... 2
- b. Humeral spine entirely concealed in a protruding dermal flap which is fringed below..... *Ichthyoscopus*
2. a. Two dorsal fins, sometimes connected at base, the first with spiny rays..... 3
- b. One dorsal fin, with soft rays only..... 6
3. a. D IX-II.8, A II.8, spines of first dorsal short, reduced to a series of immovable tubercles..... *Pleuroscopus*
- b. D III to V, 13 to 15; A 13 to 15..... 4
4. a. Barbel on chin..... *Nematagnus*
- b. No barbel on chin..... 5
5. a. Head above only covered with a transverse bony plate, whence proceeds a Y-shaped apophysis which sends a limb to each orbit..... *Astroscopus*
- b. Upper surface of head behind eyes entirely encased..... *Uranoscopus*
6. a. Body naked..... 7
- b. Body scaly..... 9
7. a. D 12, A 17..... 8
- b. D 13 to 18, A 13 to 18, in one species D 10 or 11, A 11 or 12, angle of praeoperculum rounded, not protruding..... *Kathetostoma*
8. a. Angle of praeoperculum with a short blunt spine..... *Ariscopus*
- b. Angle of praeoperculum developed as a long flattened wing-like appendage, without spine, its length approximately 2.9 in head..... *Execestides*
9. a. D 13 to 20, A 17 or 18, barbel on chin..... *Genyagnus*
- b. D 12 to 14, A 16 to 18, no barbel on chin..... *Gnathagnus*

### Synopsis of the Genera

(Synonyms are marked with a dagger †)

*Uranoscopus* Linnaeus (1758, p. 250)—type by monotypy *Uranoscopus scaber* L. Many species in nearly all tropical and subtropical seas.

*Ichthyoscopus* Swainson (1839, p. 131, 269) (often written *Ichthyosopus*, an emendation by Agassiz)—type by subsequent selection by Gill (1861), *Uranoscopus inerme* Cuvier & Valenciennes = *Uranoscopus Lebeck* Bloch & Schneider. Five species: *I. lebeck* (Bloch & Schneider, 1801); *I. fasciatus* Haysom (1957), *I. spinosus* n.sp., *I. insperatus* n.sp., *I. barbatus* n.sp.

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*Astroscopus* "Brevcoort" Gill (1860, before March 21, p. 20)—type by monotypy *Uranoscopus anoplos* Cuvier & Valenciennes (1831) = *Uranoscopus y-graecum* Cuvier & Valenciennes (1829, p. 229), cf. Jordan & Evermann (1898) and Jordan, Evermann & Clark (1930). Four species: *A. y-graecum* (Cuvier & Valenciennes), *A. guttatus* Abbott (1860, p. 365), *A. sexspinosus* (Steindachner, 1876, p. 167 pl. XIII Fig. 1) and *A. zephyreus* Gilbert & Starks in Gilbert (1897, p. 453, pl. LIV and LIII Fig. 2).

†*Agnus* Günther (1860, after June 1, p. 229)—type by monotypy *Uranoscopus anoplos* Cuvier & Valenciennes (1831, p. 493) = *Uranoscopus y-graecum* Cuvier & Valenciennes (1829), therefore a synonym of *Astroscopus*.

†*Anema* Günther (1860, p. 230)—based on *Uranoscopus monopterygius* Bloch & Schneider (1801), *Uranoscopus elongatus* Temminck & Schlegel (1843) and *Uranoscopus Le Beck* Bloch & Schneider (1801). These three species are now considered to belong to three different genera. Gill (1861) placed *Anema* partly in the synonymy of *Ichthyoscopus* partly in that of his new genus *Genyagnus*, whereas under his *Gnathagnus* he forgot to quote Günther, though he did so under the only species included in that genus. It is certainly not an elegant way to dispose of a name, but as both Gill's later names have generally been accepted, and in order to avoid changes, I select *Uranoscopus lebeck* Bloch & Schneider as type species of *Anema*, which makes the name a synonym of *Ichthyoscopus*.

*Kathetostoma* Günther (1860, p. 231)—type by monotypy *Uranoscopus Laevis* Bloch & Schneider (1801, p. 47). Seven species: *K. laevis* (Bloch & Schneider), *K. fluviatilis* Hutton (1872, p. 24), *K. giganteum* Haast (1873, p. 274), *K. averruncus* Jordan & Bollman (1889, p. 163), *K. albigutta* Bean (1892, p. 121), *K. nigrofasciatum* Waite & McCulloch (1915, p. 469), *K. ornatus* Wade (1946, p. 215).

*Nematagnus* Gill (1861, p. 113)—type by monotypy *Uranoscopus filibarbis* Cuvier & Valenciennes (1829, p. 307). One species: *N. filibarbis* (Cuvier & Valenciennes). The presence of a barbel on the chin in this species in my opinion hardly justifies its generic separation from *Uranoscopus*, with which it seems to agree in all other respects. According to de Beaufort (1951, p. 49) *N. filibarbis* has been insufficiently described. The type specimen should be re-examined and its status, with that of the genus based upon it, reconsidered in the light of modern knowledge.

†*Upselonphorus* Gill (1861, p. 113)—based on *Uranoscopus y-graecum* Cuvier & Valenciennes (1829, p. 229) and *Astroscopus guttatus* Abbott (1860, p. 365). As type Kirsch (1889) selected *U. y-graecum*, which makes this genus a synonym of *Astroscopus*. This name has also been written *Epsilon-phorus* (Kirsch 1889, p. 259) and *Upsilon-phorus* (Kirsch 1889, p. 262-264).

*Genyagnus* Gill (1861, p. 115)—type by monotypy *Uranoscopus monopterygius* Bloch & Schneider (1801, p. 49). One species: *G. monopterygius* (Bloch & Schneider).

*Gnathagnus* Gill (1861, p. 115)—type by monotypy *Uranoscopus elongatus* Temminck & Schlegel (1843, p. 28). Three species: *G. elongatus* (Temminck & Schlegel), *G. innotabilis* Waite (1904a, p. 238), *G. laticeps* (Longley & Hildebrand 1940, p. 264), cf. Myers, 1946. *Gnathagnoides innotabilis grandior* Whitley & Phillipps (1939, p. 225) described on the basis of the sole character of growing to a larger size than *Gnathagnus innotabilis* must evidently be considered a synonym until more convincing arguments for its separation may be brought forward.

†*Synnema* Haast (1873, p. 274)—type by original designation and monotypy *Uranoscopus monopterygius* Bloch & Schneider (1801, p. 49), hence a synonym of *Genyagnus* Gill, 1861.

†*Hypselophorus*. This name appears nowhere but in the Zoological Record (O'Shaughnessy 1878, p. 19), apparently as an emendation of *Upselonphorus*.

*Ariscopus* Jordan & Snyder (1902, p. 479)—type by monotypy *A. iburius* Jordan & Snyder. One species: *A. iburius* Jordan & Snyder (1902, p. 479).

*Excectides* Jordan & Thompson (1905, p. 253)—type by original designation and monotypy *E. egregius* Jordan & Thompson. One species: *E. egregius* Jordan & Thompson (1905, p. 253).

†*Zalescopus* Jordan & Hubbs (1925, p. 312)—type by original designation *Zalescopus tosae* Jordan & Hubbs. For reasons given in the discussion of *Uranoscopus cognatus*, I consider the differences from *Uranoscopus*, as described by Jordan & Hubbs, too slight to be of generic value and would reduce *Zalescopus* to a synonym of *Uranoscopus* with the consequence that the two species described in *Zalescopus* must now be known as *U. tosae* (Jordan & Hubbs) and *U. satsumae* (Jordan & Hubbs).

*Pleuroscopus* Barnard (1927a, p. 67)—type by original designation and monotypy *P. pseudodorsalis* Barnard. One species: *P. pseudodorsalis* Barnard (1927a, p. 67).

†*Gnathagnoides* Whitley & Phillipps (1939, p. 235)—type by original designation *Gnathagnus innotabilis* Waite. The differences between *G. innotabilis* and the type species of *Gnathagnus* as pointed out by Whitley & Phillipps, in my opinion are much too slight to justify generic separation.

†*Benthoscopus* Longley & Hildebrand (1940, p. 264)—type by monotypy *B. laticeps* Longley & Hildebrand. Myers (1946) has shown that the type species belongs to the genus *Gnathagnus* with which its authors did not compare it.

#### Genus *Ichthyoscopus* Swainson

This genus, as here defined, includes all species with a fringed humeral appendage and strongly fringed hind border of the opercle. The members of the genus also agree in having the lower



border of the praeopercle flexible, covered with skin, and without spines or other projections. The heads are heavy and entirely encased in bone, but without spiny projections anywhere. Dorsal and anal fins long, D with 17 to 20 soft rays, A with 15 to 18 soft rays. Lateral line high, closely following the dorsal fin. In the species examined both lips are fringed with fairly long barbels though on the upper lip these fringes are present in the middle only, not on the sides; in *Ichthyscopus fasciatus* these barbels seem well developed on the lower lip only; in all representatives of other genera these barbels, if present, are much smaller and more or less rudimentary.

In other characters, there is a remarkable diversity between the various species: a first, spiny, dorsal fin may be present or absent, the body may be scaled or naked, barbels on the chin may be present or absent. These differences are of a nature and magnitude which elsewhere in the family have been considered to be of generic value. To me, however, the most important fact is that, notwithstanding the apparently considerable differences, the general appearance of the diverse species is very much the same. So great is their general similarity that, in my opinion, obscuring their evident affinity by dividing them in several genera, would only do harm. To this comes the additional argument that even now the genus embraces five species only, so that from the practical viewpoint it is undesirable to chop off a few monotypic genera. Unfortunately the classification of fishes is more seriously oversplit at the generic and family levels than almost any other group of animals. It has even been seriously contemplated to propose a uninomial system as: "the logical outcome of the tendency towards monotypic genera" (Hubbs 1943). Apart from the fact that my memory is quite unable to bear the burden of the hundreds of new generic names annually coined for familiar species and species which would be equally well placed in existing genera, this oversplitting, by obscuring true affinities, is contrary to the purpose of binary classification. Hubbs, quoted above, is perfectly right about the uninomial system, but

it is the tendency towards monotypic genera which is so absurd, not the binary system that has proved its usefulness over a period of two centuries. The genus, to all intents and purposes, is a collective unit to indicate not diversity but affinity. Perhaps it is a state of mind, whether one wants to stress similarities or differences. I am perfectly aware that these arguments are neither new nor original, they have been repeated many times by workers in many fields of zoology. However, when reading the works of several contemporary leading ichthyologists, I cannot help feeling that it is not a superfluous luxury to raise the point again and again.

It is most remarkable that to a genus of which for over 150 years only one species had been known, during the last two years four species could be added, all well-characterized.

The genus is known from the seas of India, China, Japan, and Australia.

### Key to the species of *Ichthyscopus*

(The figures (counts of rays and scales) have been taken from material personally examined; the actual range of variation may be greater).

1. a. Body scaled ..... 2  
b. Body naked ..... *I. insperatus*
2. a. No barbels on chin ..... 3  
b. Two small barbels on chin, body more or less uniformly pale brownish or (small specimens) with two broad dark crossbars ..... *I. barbatus*
3. a. D II-17, A 17, dorsal spines rather weak, partly embedded in skin, upper surface dark, grey or blackish, boldly marked with white blotches of varying shape ..... 4  
b. D III-17, A 17, the anterior spiny part of the dorsal fin is only at its base narrowly connected with the soft dorsal; body spotted ..... *I. spinosus*
- c. D 20, A 18, no spiny rays in D, which is continuous and not notched, body with six transverse bands ..... *I. fasciatus*
4. a. Posterior nostril roundish (Fig. 5b) ..... *I. lebeck sannio*  
b. Posterior nostril an elongated slit ..... *I. lebeck lebeck*

### *Ichthyscopus spinosus* species nova

Differential diagnosis. Differs from all other species of the genus by the presence of a well developed spiny dorsal fin and by its remarkable colour pattern with small dots all over the body.

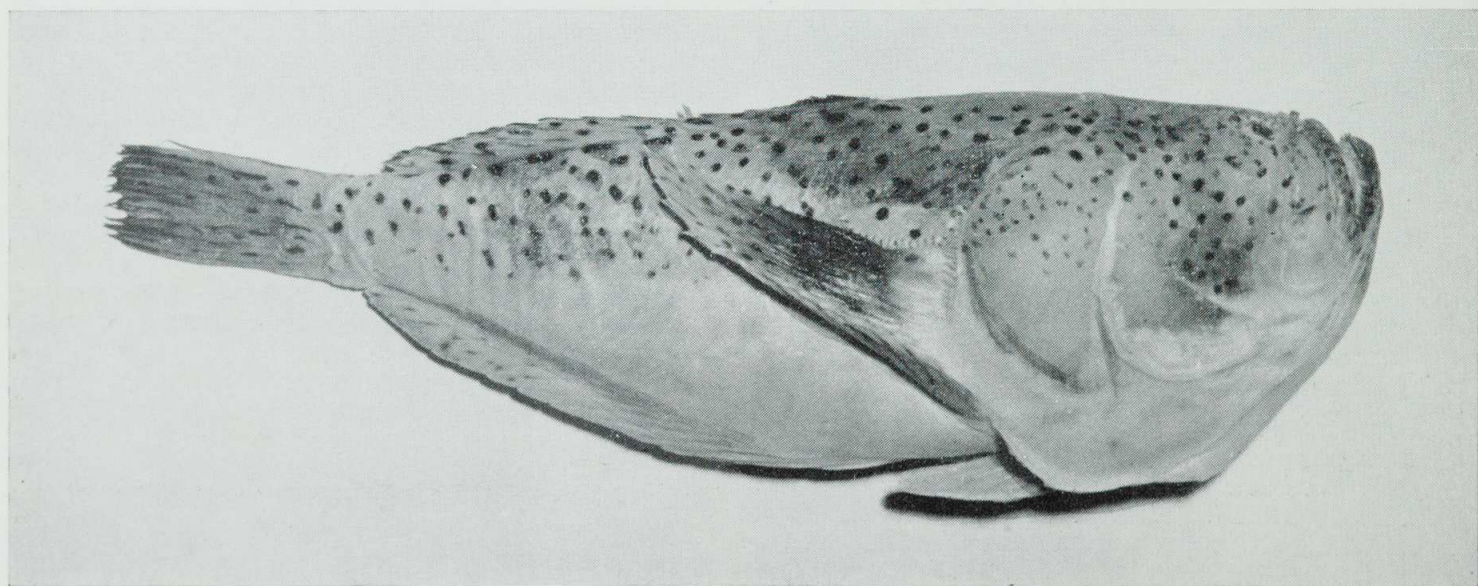


Fig. 1.—*Ichthyscopus spinosus* sp. nov., type, from right, ca. 2/5 × nat. size.



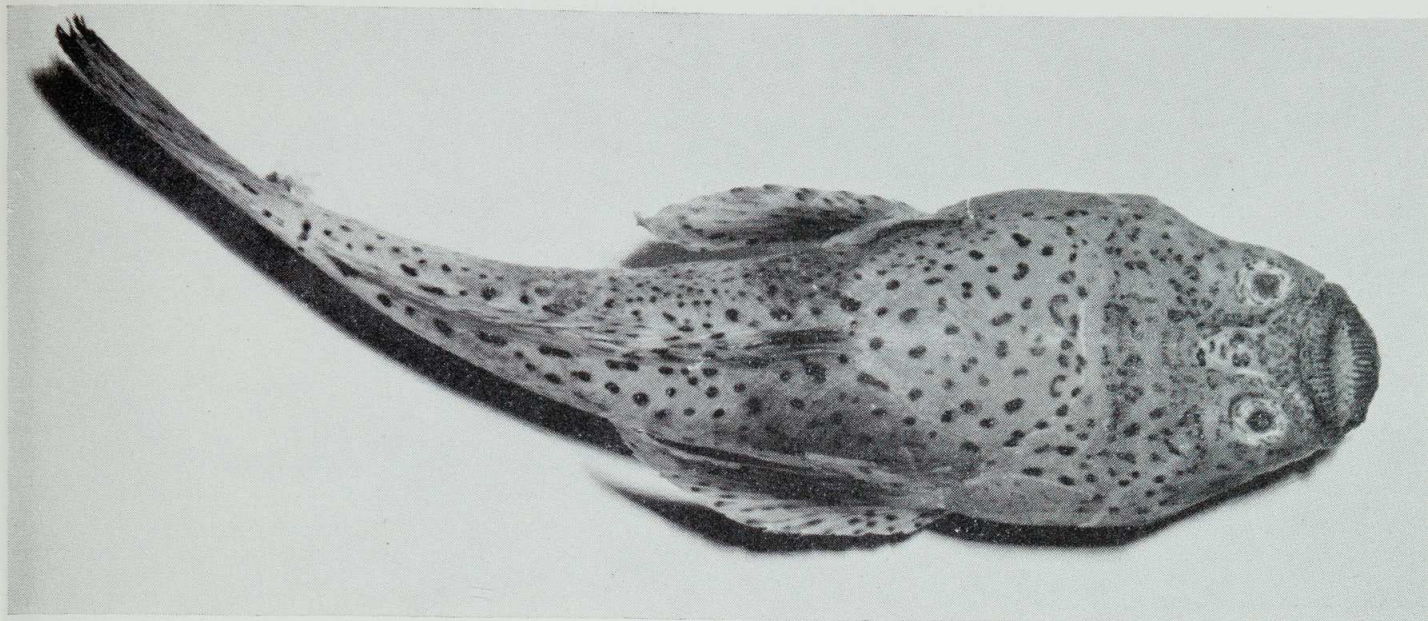


Fig. 2.—*Ichthyscopus spinosus* sp. nov., type, from above, ca.  $2/5 \times$  nat. size.

Type and unique specimen, described below, collected near Broome, N.W. Australia, received from the W.A. Fisheries Department on February 19th 1954 and presumably caught not long before. W.A.M. regd. no. P 3639.

Description. Figs. 1 and 2 give at a glance a general impression of the species and are, in my opinion, worth more than a lengthy description. The following notes are complementary to the figures.

D III.17, A 17, C with 10 divided rays and 2 developed undivided rays, P 16, V 1.5 spine concealed in skin, scales to caudal about 50 rows. Total length 330 mm, standard length 258 mm, length of D at base  $116\frac{1}{2}$  mm, length of A at base 126 mm, length of head from tip of mandible to hind border of opercle 107 mm, greatest width of head 78 mm, greatest depth of body (from D 1 to anal opening) 90 mm, width of mouth from side to side 31 mm, height of mouth (mandible) 32 mm, length interorbital sinus 24 mm, of bony armour behind 26 mm, distance between orbits  $20\frac{1}{2}$  mm, length of orbits 14 mm, nostrils close together in front of the orbits, the anterior nostril surrounded by a fringe, the posterior larger one with fringe along its anterior border only, the posterior border being formed by the orbit. Scales somewhat rudimentary, embedded in skin; breast, a great part of the belly, and the nape between the posterior border of the head armature the lateral lines and the origin of D naked.

Colours of preserved specimen. The ground colour is pale creamy, slightly tinged pinkish on the under surface and round the mouth; the whole upper half of the body including D2, P and C is dotted with dark brown spots, the majority of which are roundish, but on the neck some are rodshaped or boomerang shaped and between the eyes they are of various curly shapes. V unspotted, posterior half of A with brown spots, but less dark and well-defined than those of the back. D 1 entirely blackish brown. An ill-defined brownish area on the cheek, another above the humeral appendage, gradually

becoming paler in the direction of D 1; an ill-defined dark brown band over P, dark at the upper part of these fins, traces of a brownish half band below the middle of the soft dorsal.

#### *Ichthyscopus fasciatus* Haysom

*Ichthyscopus fasciatus* Haysom, 1957, p. 139 Fig. 1—Cleveland Bay, near Townsville, North Queensland.

Differential diagnosis. Distinguished from other species of the genus by the presence of six dark and very distinct transverse bands on the body, combined with the presence of scales.

This species was described and figured well, and is evidently quite distinct. The figure more or less suggests the presence of a humeral spine, but in the description mention is made of: "A fringed humeral appendage, which hardly projects beyond the pectoral axil".

Material. I have not seen material of this species, which is known only from the type, a specimen of 102 mm in standard length trawled in Cleveland Bay and preserved in the collection of the Department of Harbours and Marine, Brisbane.

#### *Ichthyscopus barbatus* species nova

*Ichthyscopus sannio*; Whitley, 1945, p. 42 (South-west Australia); Whitley, 1948, p. 27 (S.W. Western Australia).

Differential diagnosis. In general appearance close to *Ichthyscopus lebeck*, but differs by its plain coloration, shape of the operculum and interorbital groove for the reception of the maxillary processes, the presence of two small barbels on the chin, the simple or nearly simple, unbranched tentacles round the mouth, and larger scales.

Distribution. Only known from the western coast of South-West Australia between Dunsborough and Rottnest Island.

Type: W.A.M. regd. no. 4338.

Description. See Figs. 3 and 4, from which a general idea of the shape may be obtained.



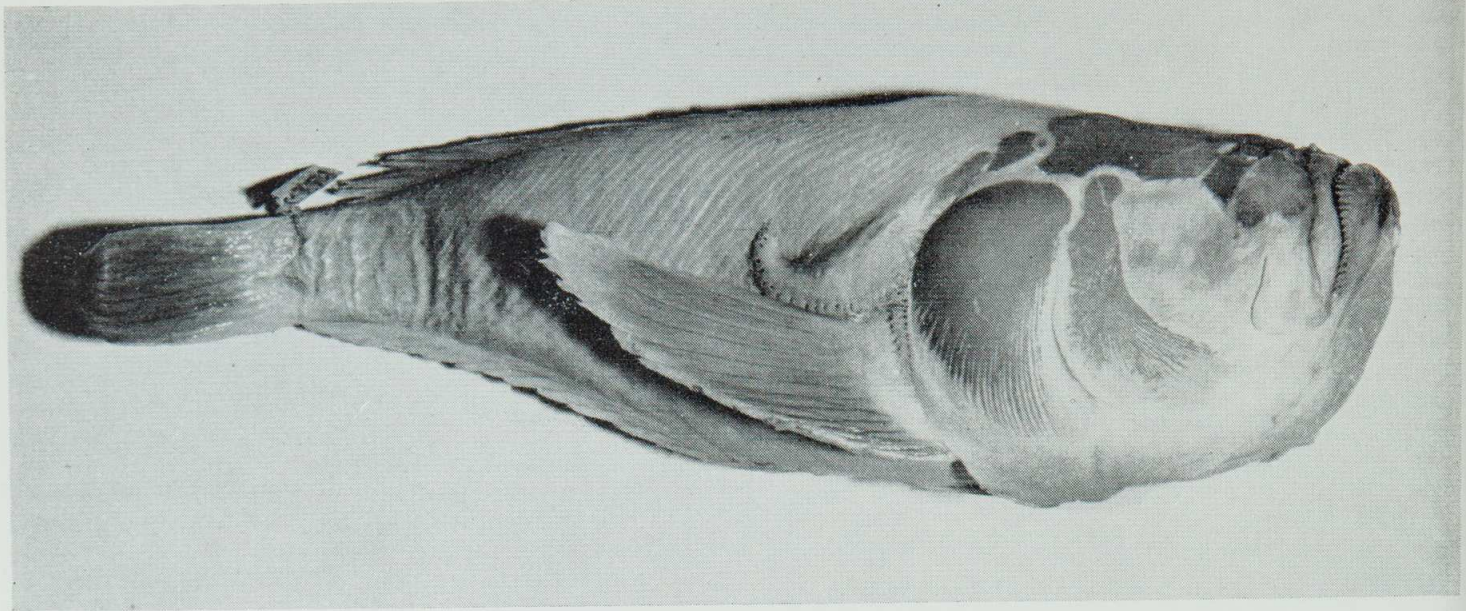


Fig. 3.—*Ichthyoscopus barbatus* sp. nov., W.A.M. no. P 3438, from right, ca.  $2/5 \times$  nat. size.

D 19 (in large specimens the anterior two or three dorsal rays may be somewhat hardened, but they are never spiny), A 15-16, C with 10 divided rays, P 14, V 1.5 with spine concealed in skin, scales in 36 to 44 rows (the exact number of rows of scales is somewhat difficult to count, as a number of rows branch at various places).

The head and sculpture of the head show a general similarity to *I. lebeck*, but differ as follows (Fig. 5a): two small barbels are always present, one above the other, on the middle of the chin, the lower of these being the larger; the tentacles surrounding the mouth are undivided or practically so, the fringes round the nostrils are less well developed, the naked space between the eyes for the reception of the maxillary processes is square behind, the operculum is more strongly curved antero-dorsally than postero-dorsally, the postero-ventral border of the maxillary makes about a right angle.

Colours of fresh specimen (P 4424). Upper parts pale brown, under surface pinkish (white, somewhat transparent skin with red blood shining through), exposed bony parts of head

brownish red, soft part of cheeks smoky brown, an ill-defined brown band from across the humeral appendage to the first five rays of the dorsal fin, and a second band underneath the posterior 7 rays of the dorsal fin and to base of caudal fin; sides of caudal peduncle with a blackish brown spot of the size of a farthing; D light brown, blackish brown at the outer edge; A whitish, somewhat reddish pink from blood; C black, P dull brown with whitish base, V pinkish white.

Colours of preserved specimens. All the ruddy tinge has gone, not only from the under surface but also from the head, so that only brownish and white remain. Small specimens are evidently more distinctly coloured. The two specimens of lot P 4431, notwithstanding the fact that they had been kept in formalin for  $4\frac{1}{2}$  years before I first examined them, still show dark cheeks, a dark tail, and two rather well-defined dark bands on the back. The anterior of these includes the posterior part of the humeral appendage and the first three dorsal rays, the posterior is under the 13th to the 17th

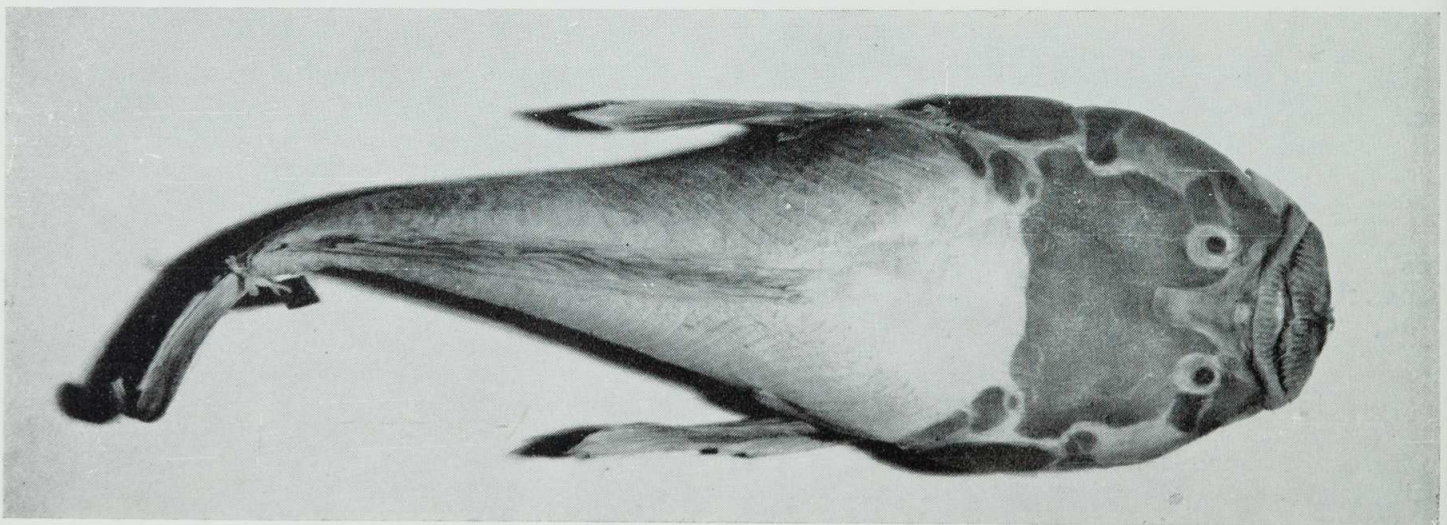


Fig. 4.—*Ichthyoscopus barbatus* sp. nov., W.A.M. no. P 3438, from above, ca.  $2/5 \times$  nat. size.



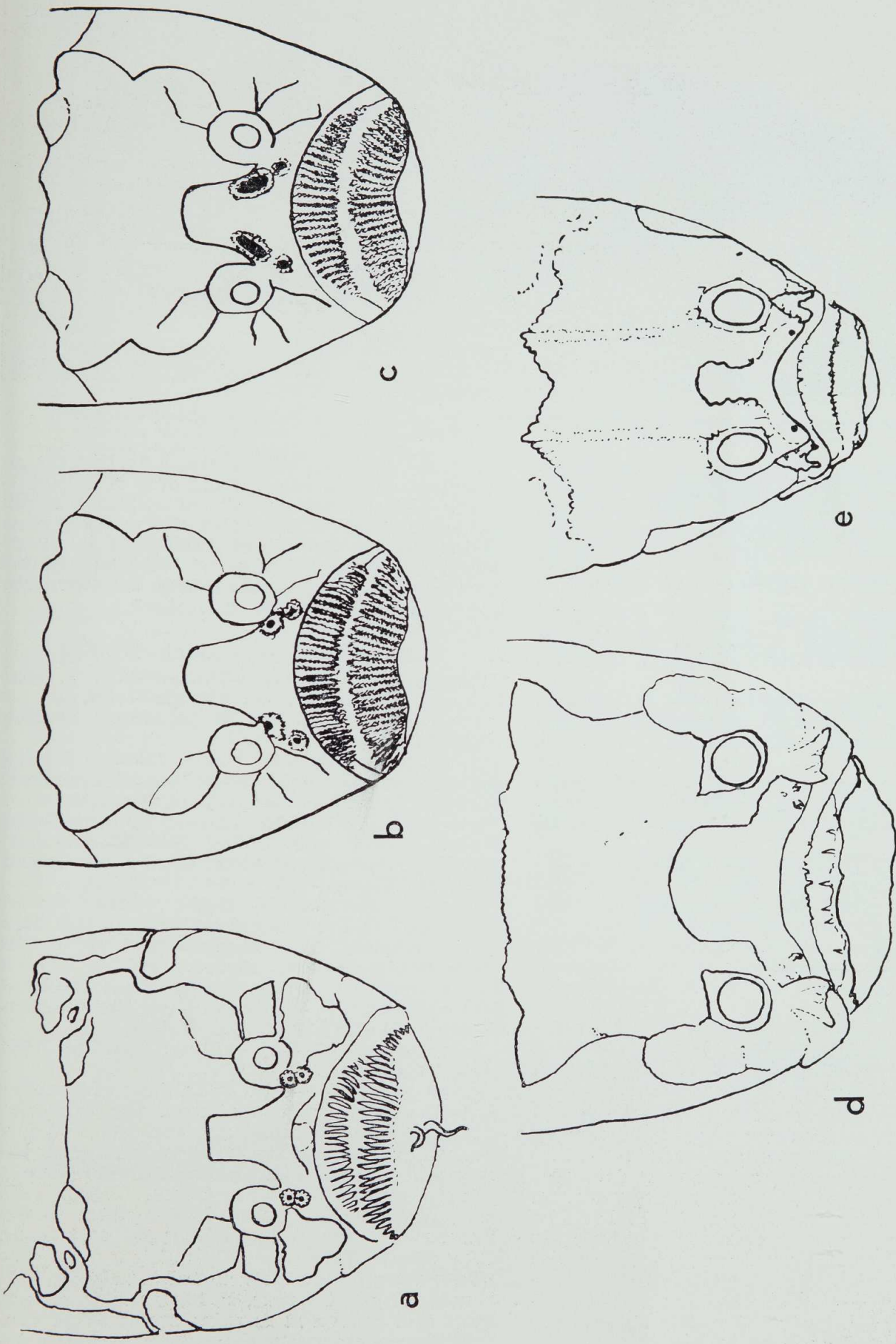


Fig. 5

- (a) *Ichthyoscopus barbatus* sp. nov., head from above.
- (b) *Ichthyoscopus lebeck sannio* Whitley, head from above.
- (c) *Ichthyoscopus lebeck lebeck* (Bloch & Schneider), head from above.
- (d) *Kathetostoma laeve* (Bloch & Schneider), head from above.
- (e) *Kathetostoma nigrofasciatum* Waite & McCulloch, head from above.



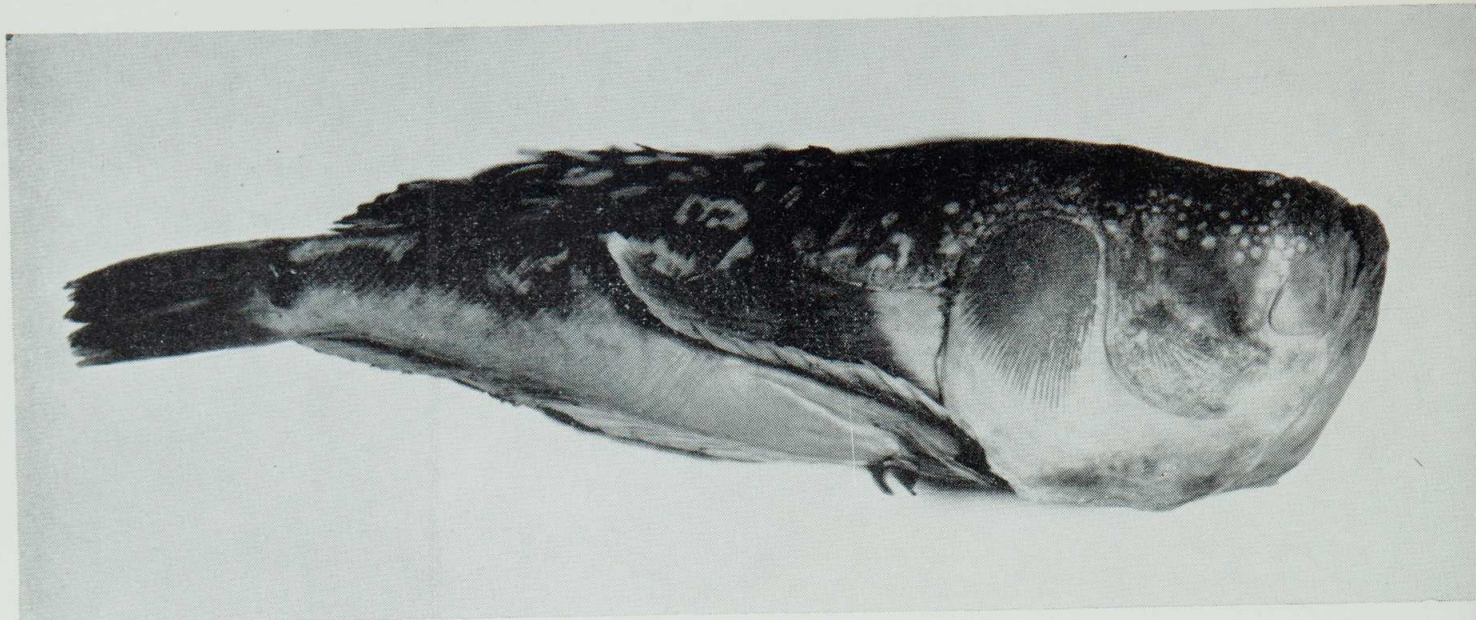


Fig. 6.—*Ichthyscopus lebeck sannio* Whitley, Aust. Mus. no. I.B. 2152, from right, ca. 7/20 × nat. siz.

dorsal ray; they are dark (blackish in the smaller specimen, somewhat paler in the larger specimen), very distinct on the back, and fading out down the sides, the anterior one above the base of the pectoral fin, the posterior one lower down.

Material. Seven specimens in the W.A. Museum.

P 672 Woodman's Point, received from fish-market Fremantle, 19.XI.1919, total length 25 cm, standard length 20 cm, D 19, A 16, L.l.±44.

P 1296 Busselton, received from Mr. A. J. Smith, registered on 27.V.1933, total length 187 mm, standard length 147 mm, D 19, A 16, L.l.±36

P 3488 Dunsborough, received from Mr. Alan Poole, registered on 9.II.1952, total length 40 cm, standard length 32.5 cm, D 19, A 16, L.l.±41.

P 4338 Between Rottnest Island and the Stragglers, collected by Mr. G. Turner on 22.X.1958, total length 41 cm, standard length 34 cm, D 19, A 16½, L.l. 37.

P 4424 Eagle Bay, collected by Mr. L. Beaman on 2.IV.1959, total length 375 mm, standard length 300 mm, D 19, A 15, L.l.±43. Weight 1245 g.

P 4431 (two specimens) Rottnest Island, collected by C.S.I.R.O. on 14.XI.1954, total length 130, 157 mm, standard length 105, 124 mm, D 19, 19, A 16½, 16, L.l. 37 and 38.

Habits, etc. Only on the two most recent specimens some information was received: specimen P 4338 was caught on a line with meat bait in 25 to 30 ft of water, specimen P 4424 was caught on prawn bait in about 9 ft of water on sand bottom near a reef at about 15 hrs. In the fresh specimen, and even more so when it was first captured, as Mr. Beaman told me, the eyes protrude, and actually stick out like hornlets on top of the head. In preserved specimens the eyes fall back and hardly suggest the curious position they have in life.

Discussion. Whitley (1945, 1948) identified the specimens of this species in the Western Australian Museum as *Ichthyscopus sannio* and

originally, judging from descriptions, this led me to believe that *barbatus* would only be subspecifically distinct, but actual comparison between specimens from eastern and western Australia showed such a number of differences as enumerated above, that I have no hesitation in describing it as a full species though it is obviously not too distantly related to *I. lebeck*.

#### *Ichthyscopus lebeck sannio* Whitley

*Ichthyscopus sannio* Whitley, 1936, p. 45—Patonga, Broken Bay, New South Wales.

*Ichthyiscopus inermis*; Waite, 1899, p. 28 (New South Wales).

*Ichthyscopus inermis*; Waite, 1899, p. 112 (off the coast of New South Wales: many localities); Borodin, 1932, p. 96 (Southport, Queensland).

*Anema inerme*; Waite, 1904b, p. 50 (New South Wales); (pt.) Stead, 1906, p. 206 (Eastern Australia: specimen mentioned from Pelican Island, Brisbane Water, N.S.W.).

*Ichthyscopus lebeck*; Ogilby, 1918, p. 105 (Tewantin, Qld.); McCulloch, 1922, p. 102 (New South Wales); (pt.) McCulloch, 1929, p. 335 (New South Wales); Munro, 1945, p. 147-148 Fig. 6 (mouth of Noosa River, Qld.); Ogilby & Marshall, 1954, p. 84, 85 note (off the coasts of Queensland and New South Wales).

*Ichthyscopus lebeck*; (pt.) de Beaufort, 1951, p. 50 (Australia).

Differential diagnosis. The dark grey colour with the bold white markings, the somewhat rudimentary first dorsal fin, and the branched tentacles at the mouth, serve to distinguish this species from the other members of the genus.

Distribution. Seas of China, Japan, and eastern Australia, where known from Bowen (Queensland) down to Wollongong and Nowra (New South Wales).

Description. See Figs. 6 and 7. D II.17, A 17, C with 10 divided rays, P 16, V 1.5 with spine short and concealed in skin; scales 50-54 rows.

This form is fairly close to *I. barbatus*, but differs from that species by the presence of dorsal spines, the smaller scales, the very different coloration, the absence of barbels on the



chin, the strongly branched almost bushlike tentacles surrounding the mouth, the more developed fringes round the nostrils, the posteriorly rounded unarmoured space between the eyes, the dorsally evenly rounded opercles, and the sharper postero-ventral angle of the maxillary.

Colours of preserved specimens. Generally dark brown, mottled with white above, and whitish below. Unencased parts of head, including chin, and whole nuchal area brown to greyish brown, with innumerable round whitish dots of various sizes; moreover the whole upper surface of the head, including the bony parts, and the nuchal region to half way along the dorsal fin, have a great number of tiny purely black spots. The white dots mentioned above gradually increase in size backwards, and change smoothly into the pattern of the back, which is dark brown variegated with large white blotches of various and varying shape. Fringes round mouth and nostrils, and at opercles and humeral appendages, dirty pinkish, D 1 blackish, D 2 as dorsal surface dark brown with white blotches, C dark brownish, posteriorly more blackish, P blackish brown with pale lower edge, V and A colourless.

Material. Two specimens received on loan from the Australian Museum, Sydney, from the coast of New South Wales, total length 283, 430 mm, standard length 227, 354 mm.

Discussion. Whitley (1936) described this form, as a species, on the basis of the following argument: "The Stargazer recorded from Australia as *Ichthyscopus lebeck* or as its synonym *inermis*, has been identified as such with reservations. As specimens have accumulated, it has become more obvious that our form represents a hitherto unnamed species which differs from figures of the Indian type mainly in coloration, but also in shape and proportions. A Malabar example of the true *I. lebeck*, from Dr. Francis Day's collection, differs from all my Australian ones in having the preocular fringes extending backwards halfway along each side of the inter-orbital depression, whereas Australian specimens have the fringes restricted to the anterior part only; they also have the opercles and vertex

less granulated than the Indian one, and there are slight variations in fin-rays and teeth".

The "slight variations of fin-rays and teeth" without mention of the nature of these variations is, to put it mildly, not very helpful, and as regards coloration, I find that specimens of *sannio* agree quite well with Day's (1878) description and plate of a specimen from Canara (Kanara of recent maps). The character of the shape of the posterior nostril seems to hold, however, as set forth below, so that I do not follow Munro (1945) who synonymised *sannio* with *lebeck*. Both Bloch & Schneider (1801) and Cuvier & Valenciennes (1829) described and depicted *lebeck* as a fish with an elongated posterior nostril. Mr. Wheeler examined the material of the British Museum (Natural History) for me, and I quote his comments (given in litt., 27.I.1959):

"We have three specimens from China (400, 317, 225 mm standard length), one from Bellingher River estuary, N.S. Wales (225 mm) and two from Madras (185, 71 mm). All the specimens have fringes round the nostrils, but in the Chinese and the Australian specimens the second nostril is round or slightly oval, while in the Indian material the nostril is elongate. The fringe of this nostril extends in consequence between the eyes and ends level with the posterior edge of the eye".

A sketch of an Indian specimen drawn by Mr. Wheeler served as the basis for Fig. 5c.

A specimen from Japan in the Leiden Museum, examined by Dr. Boeseman, has a round posterior nostril.

Unless a future closer examination reveals more distinguishing characters, the only point of difference between *lebeck* and *sannio* appears to be the shape of the posterior nostril. As this character seems to be quite constant, it deserves nomenclatural recognition, though I consider it much too slight for specific distinction. Therefore I recognise *sannio* as a geographical race of *lebeck*, with the distribution Japan, China and eastern coast of Australia, whereas the nominate race is apparently confined to India and Ceylon.

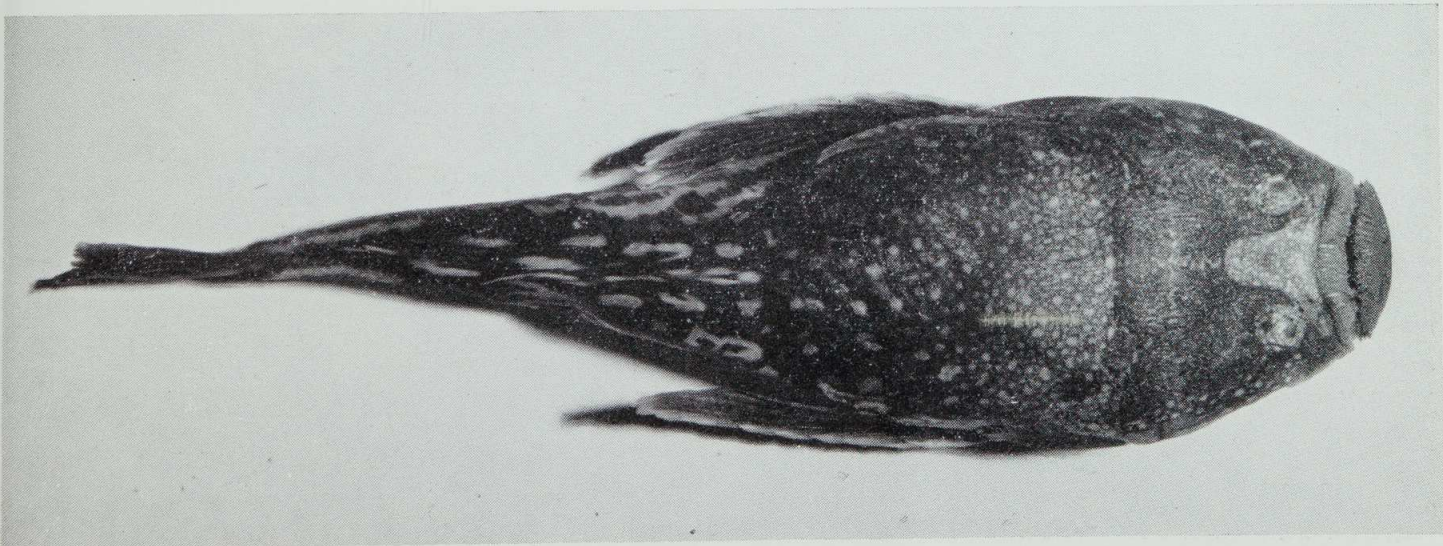


Fig. 7.—*Ichthyscopus lebeck sannio* Whitley, Aust. Mus. no. 2152, from above ca. 7/20  $\times$  nat. size.



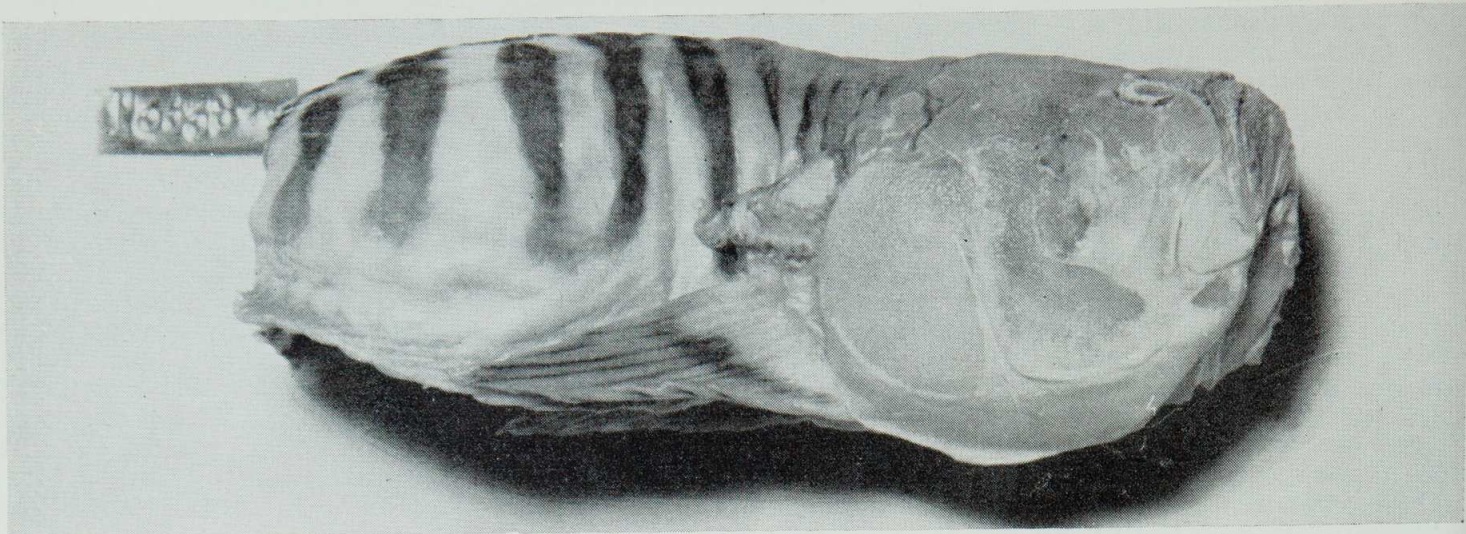


Fig. 8.—*Ichthyscopus insperatus* sp. nov. type, from right, ca. 7/10 × nat. size.

***Ichthyscopus lebeck lebeck* (Bloch & Schneider)**

*Uranoscopus lebeck* Bloch & Schneider, 1801, p. 47—Tranquebar, India (reference copied).

Differential diagnosis. Differs from *sannio* and for that matter from all other species of the genus, by the shape of its posterior nostril, which is not roundish, but an elongated slit (Fig. 5c).

Material. None.

Discussion. Particulars on this race have been given in the discussion of *I. lebeck sannio*.

***Ichthyscopus insperatus* species nova**

Differential diagnosis. Strikingly differs from the other species of the genus by the absence of scales, and by its very distinct colour pattern, with twelve vertical dark bands on body and tail (Figs. 8 and 9).

Type and unique specimen collected in Roebuck Bay, N.W. Australia, received from the W.A. Fisheries Department on February 15th 1954, and presumably caught not long before. W.A.M. regd. no. P 3638.

Description. D 17, A 17, C with 10 divided rays, P. left 13, right 14, V 1.5, spine small and concealed in skin. Total length about 215 mm, standard length about 170 mm (the specimen is curled up as the photographs show, and notwithstanding prolonged soaking in water it proved impossible to relax it), length of head from tip of mandible to hind border of opercle 63 mm, greatest width of head 55 mm, greatest depth of body (from anterior part of D to anus) 52 mm, width of mouth from side to side 24 mm, height of mouth (mandible) 19 mm, length of naked space between eyes  $12\frac{1}{2}$  mm, of bony armour behind 23 mm, distance between orbits



Fig. 9.—*Ichthyscopus insperatus* sp. nov., type, from above, ca. 7/10 × nat. size.



13 mm, length of orbits  $8\frac{1}{2}$  mm, nostrils small, close together, roundish, in front of eyes, both, but particularly the anterior one, surrounded by small fringes. Bony upper surface of head with a somewhat reticulated appearance, as is well shown in Fig. 9. Hind border of opercle and humeral appendage fringed, D with soft rays only, continuous, without notch, C rounded, P long, pointed, 4th ray longest.

Colours of preserved specimen. Pale brown above, darkest on the nuchal region, almost colourless below, with twelve dark brown cross-bands which are dark on the back and gradually fade away two-thirds down the flanks towards the belly. These bands are darkest at the edges, and the three anterior bands actually consist each of a double band as their central parts are quite as pale as the remainder of the surface of the body in that region. The bands are situated as follows: the first from the anterior part of the humeral appendage over the nuchal region; the second from the middle of the humeral appendage over the nuchal region, passing well in front of origin of D; the third includes the membrane between the first and the second dorsal ray, and goes from there downwards and slightly backwards; the fourth includes the third and the fourth dorsal ray, and leads downwards where it fuses with the third band; the fifth includes the tip of the fifth, and sixth, and the basal portion of the seventh dorsal ray, tapering downwards where it closely approaches the sixth band; the sixth leads from the bases of the 9th and the 10th dorsal rays, tapering downwards (the tips of the two rays involved are also dark brown, but their middle parts are colourless); the seventh goes from the 12th and 13th dorsal ray downwards; the eighth goes from the 15th, 16th and 17th dorsal ray downwards; the ninth goes from the back of the caudal peduncle downwards; the tenth, eleventh and twelfth are on the rays of the tail at equal distances. Moreover the tips of the caudal rays are blackish brown, and in its posterior part D has a subterminal blackish brown band on its rays; P is crossed by two indistinct brownish bands.

Interorbital sinus white and brown vermiculated, fringes of the lips pale pinkish brown with white spots.

Discussion. The reasons for including this scaleless species in the genus *Ichthyscopus* have been given on a previous page.

#### Genus *Kathetostoma* Günther

A well-defined genus characterised by the naked body, a strong humeral spine, and a spineless dorsal fin; D and A usually short. D 10-18, A 11-18. The number of rays is not given in the original description of *K. albigutta* (Bean 1892), but according to Jordan & Evermann (1898, p. 2312) it is D 10, A 12, whereas Barbour (1941) found D 11, A 11. It is difficult to understand why Jordan & Evermann conclude their essay on the species with the remark "1 specimen known" as Bean in the original description records six specimens and they themselves noted "different specimens" a few lines earlier! Barbour (1941) commented upon this, but drew the wrong conclusion, as is evident from his reference

to the "unique type", whereas actually there were six co-types. Though I have not examined material of the species I find it difficult to believe that the seas round Cuba would be inhabited by a subspecies different from that occurring in the Gulf of Mexico, as Barbour claimed.

The genus is known from southern Australia (two species), New Zealand (two species), Pacific coast of tropical America (two species), and the Gulf of Mexico (one species).

Only the Australian species concern us here: both occur off the Western Australian coast and are represented in our collection; they can be separated as follows:

1. a. D 15-16, A 14-15½, orbit postero-medially pointed (Fig. 5d)..... *K. laevis*
- b. D 13-14, A 13-14, orbit roundish (Fig. 5e)..... *K. nigrofasciatum*

#### *Kathetostoma laevis* (Bloch & Schneider)

*Uranoscopus laevis* Bloch & Schneider, 1801, p. 47, pl. VIII—New Holland = New South Wales (reference copied).

*Ichthyscopus laevis*; Swainson, 1839, p. 269 (reference copied).

*Kathetostoma laevis*; Günther, 1860, p. 231 (Port Arthur, Tasmania); de Castelnau, 1872, p. 91 (rather common on the Melbourne market); Macleay, 1880, p. 562 (Tasmania, Melbourne); Macleay, 1881, p. 197 (Tasmania, Melbourne); Johnston, 1883, p. 115 (Tasmania, northern coasts); Tenison-Woods, 1883, p. 192 (Melbourne); Johnston, 1891, p. 33 (Tasmania); Waite, 1899, p. 113 (Port Jackson); Waite, 1904b, p. 50 (New South Wales); Stead, 1906, p. 206-207, pl. VIII (Victoria, Tasmania, New South Wales); Waite, 1911, p. 242 (Australia); Waite & McCulloch, 1915, p. 469-471 (New South Wales, Victoria, Tasmania; Investigator Group, South Australia); Waite, 1921, p. 140 Fig. 219 (no locality mentioned = South Australia); McCulloch, 1922, p. 102 (no locality mentioned = New South Wales); Waite, 1923, p. 163, Fig. (South Australia); (pt.) McCulloch, 1929, p. 335 (Victoria, New South Wales, Tasmania); Mees, 1959, p. 9 (Esperance, W.A.).

*Cathetostoma laevis*; Gill, 1861, p. 114 (Australian seas).

Differential diagnosis. D 15-16, A 14-15½; a very convenient character to distinguish this species from the following is the shape of the orbits and sculpture of the bony armour on the dorsal surface of the head; this difference was already noted and illustrated by Waite & McCulloch (1915) but to assist ready identification I give sketches of both.

Distribution. Coasts of New South Wales, Victoria, Tasmania, South Australia (off the Investigator Group, South Australia, cf. Waite & McCulloch, 1915, p. 471), and Western Australia (recently recorded by me for the first time, cf. Mees, 1959). McCulloch (1929, p. 335) apparently overlooked the occurrence in South Australia as published by Waite and himself but included New Zealand in the range. Probably this record is based on Hutton (1872, p. 23), whose *K. laevis* was placed in the synonymy of *K. giganteum* (a species not yet described at the time) by Phillipps (1927) and others. A con-



venient difference between the two species seems to be the larger number of dorsal and anal rays in *K. giganteum*, and the fin-ray formula given by Hutton for his *K. laeve*: D 16-17, A 17-18 is very high for that species and fits *K. giganteum*. Admittedly Haast (1873) described *K. giganteum* as having D 16, A 14, but Waite (1911) on re-examination of the type specimen found that its actual formula was D 18, A 17 or 18. From the fact that Hutton (l.c.) gave a range of variation for D and A whereas he clearly stated to have but a single specimen, it is evident that the figures presented were copied from literature and not taken from his specimen. Günther's (1860) count for *K. laeve* is also high (D 17, A 17), higher than one would expect for that species, and if this count correctly represents the fin-ray formula of his specimens, they are likely to belong to *K. giganteum*, a species not yet described at the time, and not to *K. laeve*. Anyway, for the moment I feel justified in accepting Phillipps's identification and exclude New Zealand from the range of the species. It may be remarked that Hutton's (1890, 1896) identification of *K. giganteum* with *K. laeve*, which probably caused the confusion, was not accepted by subsequent revisers (Waite & McCulloch 1915), and Hutton (1896, p. 315) himself already suggested that *giganteum* might be a valid species.

Material. Two specimens in the Western Australian Museum.

P 1745 Esperance, received from Mr. P. F. Sullivan, registered on 7.IV.1937, total length 322 mm, standard length 265 mm, D 15, A 15.

P 3629 Esperance Bay, received from Dr. K. Sheard, registered on 16.I.1954, total length 355 mm, standard length 290 mm, D 16½, A 14½ (15?).

Besides, there is in our collection an old mounted specimen from Tasmania (no precise locality or date).

Eight specimens received on loan from the National Museum of Victoria range from 225 to ± 430 mm total length, 180 to ± 370 mm standard length, D 15-16, A 15-15½, except one specimen which has evidently been damaged in its youth and has D 11, though in front of D a few tubercles covered with skin are apparent.

#### *Kathetostoma nigrofasciatum* Waite & McCulloch

*Kathetostoma nigrofasciatum* Waite & McCulloch, 1915, p. 469, pl. XIII Fig. 1, 2—Doubtful Island Bay, South-western Australia, 20-25 fathoms.

*Kathetostoma nigrofasciatum*: Waite, 1921, p. 141, Fig. 220 (South Australia); Waite, 1923, p. 164, Fig. (South Australia); McCulloch, 1929, p. 335 (South Western Australia); Whitley, 1948, p. 27 (south coast of Western Australia).

Differential diagnosis. D 13-14, A 13-14; the differences between this species and *K. laeve* are given under that species and in the key.

Distribution. Known from the coasts of South Australia and the south coast of Western Australia.

Material. Three specimens in the Western Australian Museum.

P 710 Off Bald Island, received from Chief Inspector of Fisheries on 25.VIII.1920. Total length 238 mm, standard length 190 mm, D 14, A 13½.

P 1057 "South of Rottneest" <sup>1</sup>, W.A. Trawling Co. Ltd., registered in October 1929. Total length 260 mm, standard length 210 mm, D 14, A 14.

P 2317 Albany, received from Mr. R. C. Winteford, registered on 25.VIII.1941. Total length 21½ cm, standard length 17½ cm, D 14, A 14.

#### Genus *Uranoscopus* Linnaeus

This genus is characterized by a scaly body, strong humeral spine, two dorsal fins, either entirely separated or connected at their bases, of which the first is spiny, and by the head which is almost entirely encased in heavy bony armour, with spines along the lower edge of the praeoperculum.

The genus occurs in all tropical and subtropical seas in a fairly large number of species.

Two species have been recorded from Australia, but there is a possibility that these are identical.

#### *Uranoscopus cognatus* Cantor

*Uranoscopus cognatus* Cantor, 1849, p. 1003—Sea of Penang (reference copied).

*Uranoscopus cognatus*; Mees, 1959, p. 9 (Shark Bay).

Material. A single specimen of a *Uranoscopus* of which the characters agree with *Uranoscopus cognatus* as given by de Beaufort (1951).

P 4280 Trawled between Kok's Island (N. end Bernier Island) and Quobba Point (N. of Carnarvon), Shark's Bay, by "Bluefin", W. & W. Poole, 23-30 July 1958.

Description. The specimen mentioned above has an overall length of 183 mm, standard length 149 mm, depth of body 40 mm, breadth of head 54 mm, D III-13, A 13, lower border of praeoperculum with four spines, lower edge of suboperculum with one spine, scales in about 56 series, humeral spine well-developed, directed obliquely upwards and backwards; somewhat rudimentary fringes on the lips, rather better developed on the lower lip, hind border of opercles slightly fringed.

Colour of preserved specimen: brownish grey, somewhat freckled with light greyish on the nape. Body, C, and to a lesser extent P, with very small black spots. C and D greyish, D 1 black with the lower half of the first spine and its membrane white, and a small basal patch at the end below and behind the third ray white.

Discussion. Two specimens ascribed to *Uranoscopus terrae-reginae* Ogilby (1910) received on loan from the Australian Museum and

<sup>1</sup> This probably means that the company from which the specimen was received extended its operations all along the coast of Western Australia south of Rottneest Island, and that the specimen may have been captured anywhere along the south coast. Certainly there is no proof that it was collected near Rottneest or elsewhere along the west coast. The locality of provenance of the specimen, therefore, is uncertain.



belonging to the original Endeavour material, compare very well with our specimen of *cognatus*, but for the differences described below. They measure 120 and 129 mm in standard length. The bony parts of the head in our specimen are somewhat more rugose, which is to be expected in a larger specimen, and they are entirely decolourized with the exception of the black on D 1 which has the same shape and extent as in our specimen; the general shape and pattern of the bony parts of the head, spines, and number of rows of scales agree, but whereas in our specimen the whole region on the back from nape to lateral lines is devoid of scales, in the two specimens of *terrae-reginae* this part of the back, with the exception of the nape just behind the bony armour, is covered with small scales, as already mentioned by Ogilby (1910).

I found it difficult to judge how important the character of the squamation of the nuchal area was and asked Mr. Whitley for information on the material retained in the Australian Museum, which includes a specimen recently caught off the coast of New South Wales. He replied as follows (in litt., 15.IX.1959): "With reference to *Uranoscopus terrae reginae*. In 8 cotypes, 2 have the predorsal area naked but the rest have scales for about half or more than half the distance from origin of dorsal fin to parietals. The New South Wales specimen has naked nape and predorsal area. There are no spots on the heads or bodies of any of the specimens as in your specimen of *cognatus*."

Unless the type material consists of a mixed sample of two different species, it would seem that the character of the squamation of the nape varies within one species (perhaps small specimens have scales which may disappear with growth), whereas even in the specimens with scales on the nape, not the whole nuchal region is covered by them. In my opinion this is ample proof that the presence of scales on the nape cannot be used as a generic character, and therefore the genus *Zalescopus* becomes a synonym of *Uranoscopus*.

For the moment the status of *Uranoscopus terrae-reginae* must remain unsettled, for though the evidence put forward above is suggestive of the possibility that this name is a synonym of *U. cognatus*, the available material is insufficient to decide this with certainty. *Uranoscopus terrae-reginae* was hitherto only known from Queensland, but in August 1959 the Australian Museum received a small specimen from 72 fathoms, E. of Newcastle, N.S.W. Mr. Whitley (in litt., 10.VIII.1959) kindly allowed me to publish this record, and added a description of its colours in life, as taken by Dr. A. A. Racek:

Upper side bluish-grey, with occasional and irregular dark grey spots, widely interspaced. Projecting spines reddish brown. Ventral side light grey. Caudal fins with yellow tinge. Eyes light blue.

Concerning Ogilby's (1910) paper, in which the description of *Uranoscopus terrae-reginae* occurs, McCulloch (1914) made some interesting remarks. The only copies of this work ever dis-

tributed were apparently pre-issued author's reprints. As Ogilby's paper has been quoted in the Zoological Record and has been used by later authors, it will be convenient to recognise it as having been published, though I do not think that it meets the requirements set forth by the International Commission on Zoological Nomenclature. If Ogilby's work is rejected, I shall probably become the unfortunate author of *U. terrae-reginae*, as previous records in literature (McCulloch 1914 and 1929) are nomina nuda\*.

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